

Remarks

With this response, Applicants have amended the Title of the application, have amended the Summary section of the application, and have amended claims 1-31, 33, 34, and 36-41. Claims 1-31, 33 and 34 have been amended to place them in better condition for allowance and claims 36-41 have been amended to overcome their rejection under 35 U.S.C. § 101. Thus, claims 1-34 and 36-41 are presently pending. Consideration and allowance of each of these claims is respectfully requested.

Prior Art Identified in Application Background

The Examiner's attention is directed to the references identified in the prior art section of the background of the application at paragraphs [0004]-[0009]. While the Examiner may have already received a copy of these references from the PCT International Bureau due to this application being filed under 35 U.S.C. § 371 as a national phase of PCT/SE01/01487, which already identified the references therein. These references include U.S. Patent Nos. 5,623,617, to Davidian, 5,889,996, to Adams, 5,905,895 to Halter, and 6,044,220, an article by Bell, J. R. 1973 entitled "Threaded Code," in *Communications of the ACM* 16, no. 6 (June): 370-372, and an article by Bedichek, R. 1990 entitled "Some Efficient Architecture Simulation Techniques" in *USENIX--Winter '90*, 53-63, and the abstract of JP 11296379, all of which are identified in the prior art section of the background of the application. Should the Examiner need copies of any of these references, the Examiner is encouraged to contact the undersigned and we will promptly provide copies thereof. If the Examiner already has copies of any of these references, the Examiner is respectfully requested to identify each one in a form PTO-1449 in a future communication.

Drawings

Drawing Figs. 1-3 have been amended to include the label "Prior Art" adjacent each drawing figure number identification. A sheet having these drawing figures with these proposed changes marked in red is enclosed herewith. A sheet with these drawing figures formalized is also enclosed herewith for entry, subject to Examiner review and approval of the proposed changes.

Amended Summary

The summary section of the application has been amended to overcome the Examiner's objections thereto in a manner that Applicants believe does not add new matter. Support for the amended summary can be found in the application as originally filed including, for example, Fig. 4, the original summary, and the originally filed claims. Review, allowance, and entry of the amended summary section as set forth above herein is respectfully requested. If the Examiner believes that the amended summary might need changing, the Examiner is encouraged to call the undersigned at the telephone below to discuss.

Rejection of Claims 36-41 under 35 U.S.C. § 101

Claims 36-41 have been amended to overcome their rejection under 35 U.S.C. § 101 and are believed presented in condition for allowance. More specifically, each of these claims have been amended to recite an interpreter for executing a computer program, which is believed to constitute statutory subject matter under 35 U.S.C. § 101. Consideration and allowance of each these claims is respectfully requested.

Rejection of Claims 1-35 and 36-41 under 35 U.S.C. § 102

Claims 1-35 and 36-41 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Bennett, U.S. Patent No. 4,506,325. Applicants submit that claims 1-35 and 36-41 are presented by this response in condition for allowance and their allowance is respectfully requested.

Independent Claim 1

Independent claim 1 is believed to be presented in condition for allowance because the Bennett reference fails to disclose, teach or suggest, alone or in combination with any other reference of record, “means for grouping frequently used service routines *with program jumps between each other* in a program function with regard to a predetermined frequency value” (emphasis added) used to select which service routines are grouped in the program function. In particular, for example, the Bennett reference fails to disclose, teach or suggest grouping frequently used service routines in a program function with there being *program jumps between those service routines* grouped in the program function. By enabling program jumping between service routines in the same program function, more efficient operation results because it is more efficient to jump between service routines in the same program function than it is to jump between program functions, such as what would occur if there were no program jumps between service routines in the same program function.

While Bennett appears to disclose generating statistics by counting the number of times instructions appear in a program while compiling that program, Bennett fails to disclose, teach or suggest, alone or in combination, grouping service routines in a function based on execution frequency *and* “means for recording the frequency of service routines executed after” the function as is claimed in claim 1. Bennett also fails to disclose, teach or suggest “means for assigning frequently used service routines a shorter code than service routines” executed after the function. In addition, Bennett also fails to disclose, teach or suggest doing so from an execution, as is recited in claim 1, as Bennett, to the extent it discloses generating statistics, only discloses doing so when compiling a program and not during program execution. While the methodology disclosed in Bennett is capable of saving storage space, it cannot provide the benefits of the

claimed invention – which optimizes the service routines in the claimed manner resulting in advantageously faster execution speed.

For at least these reasons, claim 1 is believed presented in condition for allowance and its allowance is respectfully requested.

Dependent Claims 2-14

Dependent claims 2-14 are each believed presented in condition for allowance as ultimately depending from independent claim 1, a claim also believed presented in condition for allowance for at least the reasons set forth above. In addition, each one of claims 2-14 is believed presented in condition for allowance as independently reciting patentable subject matter. For example, Bennett fails to disclose, teach or suggest (a) grouping service routines into more than one function, as is recited in claim 2, (b) reducing usage of memory bandwidth when fetching intermediate code by assigning shorter codes to the more frequently used service routines as recited in claim 3 (assigning shorter codes advantageously saves time each time they are executed because they are shorter), (c) collecting frequency of service routine execution statistics before simulator compilation as is recited in claim 4, (d) collecting frequency of service routine execution statistics during simulator operation as is recited in claim 5, (e) configuring the interpreter to employ a branch prediction table as is recited in claim 9 (Bennett fails to disclose branch prediction tables of any kind), (f) configuring the interpreter with profile driven compilation as is recited in claim 10 (Bennett also fails to disclose profile driven compilation), (g) configuring the interpreter to perform compiler register mapping as is recited in claim 11 (Bennett makes no mention of this), (h) using no compiler-specific extensions as is recited in claim 12, (i) sequentially ordering assigned service routine codes of service routines of a program function as is recited in claim 13 (since Bennett fails to disclose assigning service routine codes of different sizes based on frequency of execution, it obviously does not disclose sequentially ordering any of the assigned service routine codes), and (j) the interpreter being used by an emulator as is recited in claim 14. For at least these reasons, dependent claims 2-14 are believed presented in condition for allowance and their allowance is respectfully requested.

Independent Claim 15

Independent claim 15 is believed to be presented in condition for allowance because, among other things, the Bennett reference fails to disclose, teach or suggest, alone or in combination with any other reference of record, *dynamic* statistics collection and recording as is required by claim 15. Bennett's disclosed method is static, as it is not capable of collecting and recording statistics during program or service routine execution. For at least these reasons, independent claim 15 is believed presented in condition for allowance and its allowance is respectfully requested.

Dependent Claims 16-28

Dependent claims 16-28 are each believed presented in condition for allowance as ultimately depending from independent claim 15, a claim believed presented in condition for allowance for at least the reasons set forth above. In addition, each one of claims 16-28 is believed presented in condition for allowance for independently reciting patentable subject matter in its own right. For at least these reasons, dependent claims 16-28 are each believed presented in condition for allowance and their allowance is respectfully requested.

Independent Claim 29

Independent claim 29 has been amended to distinguish it over the Bennett reference because Bennett fails to disclose, teach or suggest, alone or in combination with any other reference of record, an interpreter that includes a clustering mechanism that groups service routines into a *plurality* of program functions based on a predetermined frequency value. For at least this reason, independent claim 29 is believed presented in condition for allowance and its allowance is respectfully requested.

Dependent Claims 30-31

Dependent claims 30-31 are each believed presented in condition for allowance as ultimately depending from independent claim 29, a claim also believed presented in condition for allowance for at least the reason set forth above. In addition, each one of claims 30-31 is believed presented in condition for allowance as independently reciting patentable subject matter. For example, Bennett fails to disclose, teach or suggest an interpreter having a statistics mechanism devised to register the frequency of service routine execution after at least one of the plurality of program functions has been established, e.g. created, as is recited in claim 30. Bennett also fails to disclose, teach or suggest an interpreter having an encoding mechanism devised to assign a frequently used service routine a shorter code than service routines executed after one of the plurality of program functions in which service routines have been grouped, as is recited in claim 31. For at least these additional reasons, dependent claims 30-31 are each believed presented in condition for allowance and their allowance is respectfully requested.

Independent Claim 32

Independent claim 32 is believed to be patentable over Bennett because Bennett fails to disclose, teach or suggest, alone or in combination with any other reference of record, a method for an interpreter that includes the steps of registering the frequency of execution *and the execution parameters* of the service routines and grouping service routines in a program function dependent on a predetermined frequency value with the grouped service routines *having mutually referring program jumps*. For at least these reasons, independent claim 32 is believed presented in condition for allowance and its allowance is respectfully requested.

Dependent Claims 33-34

Dependent claims 33-34 are each believed presented in condition for allowance as ultimately depending from independent claim 32, a claim also believed presented in condition for allowance. In addition, each one of claims 33-34 is believed presented in condition for allowance as independently reciting patentable subject matter. For at least these reasons,

dependent claims 33-34 are each believed presented in condition for allowance and their allowance is respectfully requested.

Independent Claim 36

Independent claim 36 is believed to be patentable over Bennett because Bennett fails to disclose, teach or suggest, alone or in combination with any other reference of record, an interpreter that dynamically regroups one or more service routines during execution into one of the plurality of functions based on the frequency of service routine execution of the service routines. This produces an interpreter that is advantageously capable of adding or deleting one or more service routines from a particular function based on how frequently it ends up being executed during its execution. This ability to continually optimize the service routines by being able to regroup them during program operation advantageously increases execution speed. Bennett fails to disclose, teach or suggest continuing to group/regroup service routines by ongoing monitoring of frequency of service routine execution during program execution. Bennett only discloses a static method that gathers statistics only during program compilation, *not during program operation*. For at least these reasons, independent claim 36 is believed presented in condition for allowance and its allowance is respectfully requested.

Dependent Claims 37-41

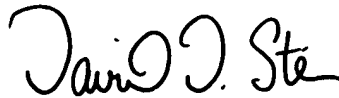
Dependent claims 37-41 are each believed presented in condition for allowance as ultimately depending from independent claim 36, a claim also believed presented in condition for allowance. In addition, each one of claims 37-41 is believed presented in condition for allowance as independently reciting patentable subject matter. For at least these reasons, dependent claims 37-41 are each believed presented in condition for allowance and their allowance is respectfully requested.

Conclusion and Petition for Two Month Extension of Time

With this response, the Commissioner is authorized to charge \$225 to Deposit Account No. 50-1170 for a two month extension of time from November 3, 2004 until January 3, 2005, for a **small** entity. No other fees are believed to be payable with this communication. However, the Commissioner is authorized to charge any fees or credit any overpayment to Deposit Account No. 50-1170.

Applicants believe the application is now in condition for allowance and such action is earnestly requested. If the Examiner believes that a telephone interview with applicants' attorney would advance the prosecution of the application, the Examiner is invited to contact the undersigned at the telephone number listed below.

Respectfully submitted,



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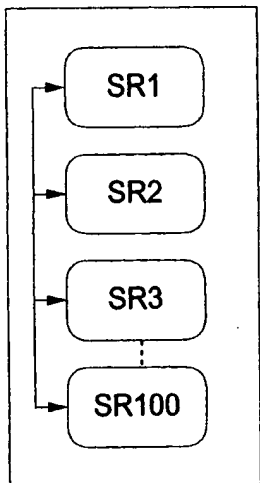


Fig. 1
(Prior Art)

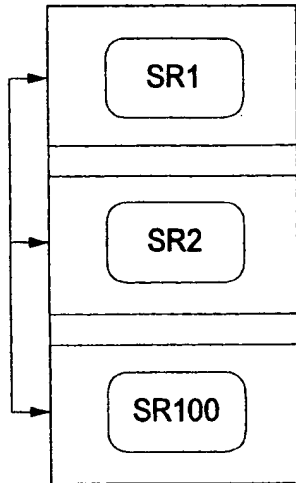


Fig. 2
(Prior Art)

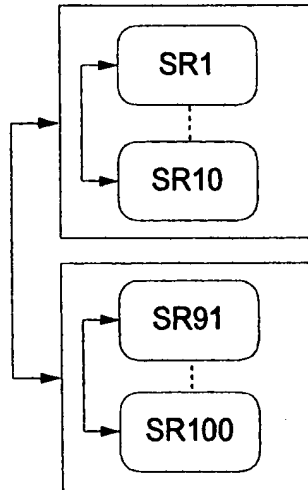


Fig. 3
(Prior Art)

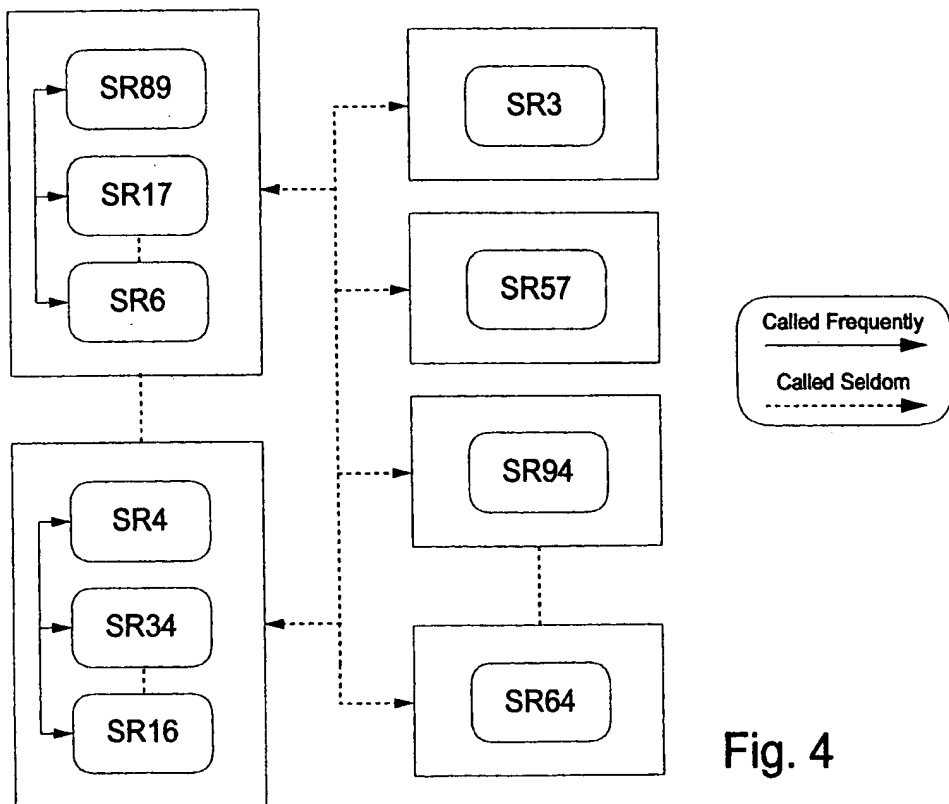


Fig. 4